What is claimed is:

1.   In a facility system for testing a power of a train, a power test facility system of a train, comprising:

a test bed for engaging a test object;

a direct current(DC) power facility formed of a converter transformer and a DC power converter;

an alternating current(AC) power facility formed of a phase balancer, a voltage adjusting transformer, and a power factor improving apparatus;

a load facility formed of an induction generator and a bi-directional inverter;

a measuring apparatus for measuring various characteristics of a propulsion apparatus; and

a control apparatus for controlling a system,

wherein said measuring apparatus is connected with the test bed, the load facility and the control apparatus; and

in the case that a power of a train is tested in a DC section, the DC power facility, the control apparatus, and the load facility are separately connected about the test bed, and the control apparatus, the DC power facility and the load facility are connected in series for thereby performing a power test of the propulsion apparatus; and

in the case that a power of a train is tested in a AC section, the AC power

facility, the control apparatus, and the load facility are separately connected about the test bed, and the control apparatus, the AC power facility and the load facility are connected in series for thereby performing a power test of the train.

2. The system of claim 1, wherein in said test facility system, said propulsion apparatus which is a tested unit, the power measuring meter, and the load facility are connected in series, and a traction motor is rotated in a normal direction by a traction power generated by the inverter which is a tested unit, and an induction generator is rotated in a reverse direction by a speed control signal in accordance with a command of the control apparatus, for thereby generating a load force.

3. The system of claim 1, wherein said load inverter of the load facility is a bi-directional inverter, and operates as a generator when the propulsion apparatus is operated in a reverse direction, and a power which is generated based on a difference between the traction power of the traction motor and a load force which occurs in the induction generator rotating in the reverse direction, is transmitted to the power facility through the load inverter for thereby restoring an electrical energy, and when braking the propulsion apparatus, the load inverter of the same operates a motor, so that an electrical energy of the power facility is used as a driving force which generates a load force.

4.   The system of claim 1, wherein in said measuring apparatus, a power meter for measuring an output power of an inverter which is a tested unit, a temperature meter for measuring a temperature the inverter which is a tested unit and the traction motor or induction generator, a driving force meter for measuring a torque and revolution which occur in a rotary shaft connecting the traction motor and the induction generator, and a standard signal processor for processing the measuring result of the power meter and the measuring result of the driving force meter are connected in series.

5.   The system of claim 1, wherein in said control apparatus, a personal computer(PC) and a PLC are connected in series, and a traction power command signal is transmitted to the inverter which is a tested unit, and a load force command signal is transmitted to the load inverter based on a result of the measurement of the standard signal processor.

6.   A power test facility system which is characterized in that a generator, a motor, an inverter, and a converter which are generally used in an industrial field are tested using a power test facility system of Claim 1.

7.   A power test method of a train implemented based on a power test facility system of a train of Claim 1, comprising the steps of:

28

a type test step of an inverter;

a combination test step combined with a converter and inverter and a traction motor;

a combination test step combined with a load inverter and an induction generator; and

a train operation simulation step which is implemented by combining the converter and inverter and the traction motor and combining the load inverter and the induction generator and using a real time simulation software in which a train information and a track information are inputted in real time.

8.   The method of claim 7, wherein a test is performed by selecting one from the group comprising a type test step, a combination test step and a train operation simulation test step, or is performed by combining at least two test steps from said group.

9.   The method of claim 7, wherein an inverter used in the combination test step and the train operation simulation test step is a bi-directional inverter.

10.   The method of claim 7, wherein said type test step and combination test step of a propulsion apparatus includes:

a step for connecting a tested unit, a peripheral, a power apparatus and a

load apparatus;

a step for connecting a control facility and the tested unit;

a step for selecting an operation type switch in normal;

a step for connecting the tested unit recording meter with the measuring

5   point, and setting an input rated voltage;

a step for setting a load inverter and selecting a responsive load;

a step for driving the tested unit and selecting a notch;

a step for selecting a braking power and operating the tested unit;

a step for measuring a breaking force, a waveform and output of each

10   measuring point; and

a step for judging and outputting a result and completing the test.

11.   The method of claim 8, wherein said train operation simulation test

includes:

15   a step in which it is judged whether a conventional scenario is used with

respect to a test or a new scenario is used, and when a new scenario is formed, a

test train car is selected, and a train car condition and track signal are selected;

a step for forming a scenario by setting a test event and a test method and

storing the formed scenario;

20   a signal simulation step in which when a conventional scenario is used

without newly forming a scenario, a certain scenario is selected, and a test is

started;

a step in which whether or not an auto operation is used is judged, in the case of the auto operation, an auto simulation is performed, and when the auto operation is not selected, a master controller key is operated;

5   a step in which a dynamic simulation is performed through a pulse width modulator(PWM);

a step for controlling a load unit;

a step in which it is judged whether a test end is completed or not, and in the case of the test completion, a test result is evaluated, and a report is prepared,

10   and in the case that the test is not completed, a test result is stored, and the routine is fed back to a signal simulation by monitoring; and

a step in which a test report is evaluated, and whether or not a retest is necessary is judged, and when the report is satisfactory, a system is completed, and when the report is not satisfactory, it is judged whether or not the simulation

15   test is necessary, and the routine is fed back to the first step, and a scenario is formed for thereby starting a test.

12.   The method of claim 11, wherein said dynamic simulation includes:

a step for inputting and storing a traction force characteristic of a train

20   and a computation formula of a train running resistance;

a step for initializing a velocity and position of a train;

a step in which an initialization state is judged, when the initialization is performed, a state of a train such as a position and velocity of a train is read;

a step for computing a train resistance using a slope and curve of a running track of a train;

a step for inputting and reading traction power, braking power and command and computing the same;

a step for computing a revolution speed and angle; and

a step for storing a velocity and position data of a train and transferring to the load controller.